

# The Mining Journal

Established 1835

Vol. CCX&XVI No. 6039

LONDON, MAY 18, 1951

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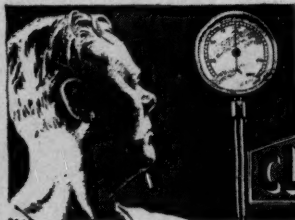
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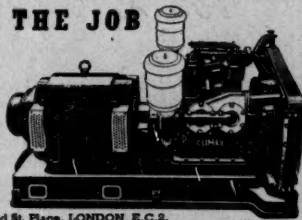
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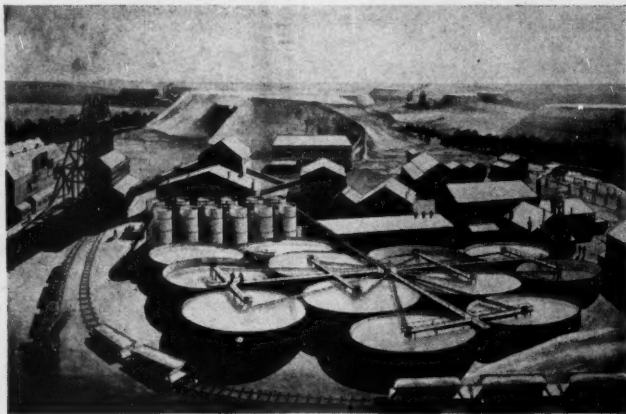
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## THIS WEEK'S FEATURES

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## NOTES AND COMMENTS

### Foreign Trade and Rearmament

At the close of the 30th British Industries Fair, the President of the Board of Trade was able to announce that the export orders booked had exceeded all expectations. Linked with the fact that last month's exports reached a new record level of £241,100,000 compared with £207,600,000 in March, and the previous peak of £222,900,000 in January, this is vastly re-assuring. No doubt part of the increase has been due to rising export prices. The expansion in the volume of exports is probably less than the increase in values, but the latter is the true standard with which to measure the success of the export drive, and the realization of higher prices is just as valuable a contribution to the narrowing of the trade gap as a quantitative increase in exports.

Nevertheless, it is apparent, upon closer examination of the trade returns, that much more spectacular progress must be achieved before the domestic economy is truly balanced. The rise of £34,000,000 in the April exports as compared with March, was partly due to the acute shipping difficulties in the earlier month. Goods which should have been shipped in March were held up for lack of transport and were cleared in April, when more outward tonnage was available.

Perhaps the figures for the first four months of the year provide a more reliable index of the trend of events. In that period exports were at the rate of £2,565,000,000 per annum, which is £185,000,000 short of the figure of £2,750,000,000 indicated in the *Economic Survey* as the minimum figure required to balance our external payments. Moreover, the annual rate of imports in the first four months of this year was £3,479,000,000, which exceeds the estimate in the *Economic Survey* by about £129,000,000. And since the further expansion of imports seems to be more probable than any contraction, it follows that to keep the trade gap within manageable proportions, a further substantial increase in the export trade will be necessary. How to attain this objective and at the same time to maintain defence production, is a problem which will severely tax the resources and the initiative of British industry.

### Nyasaland's Diamond Jubilee

One of the smaller territories of British Africa, the Nyasaland Protectorate, which, on account of its beautiful scenery, is often called the "African Switzerland," celebrated on Tuesday, in a fitting manner, the diamond

jubilee of the Foreign Office proclamation of 1891 by which the Protectorate was established. As regards mineral wealth, the Protectorate cannot vie with its neighbours, the Rhodesias and Tanganyika, and the only minerals that have been exploited on a commercial scale are gold in the Lisungwe valley and in the Blantyre district; mica, chiefly in the Mzimba district, and corundum at Tambani, in the Blantyre district. Other minerals that have been prospected include the bauxite occurrences of Mt. Mlanje, the coal deposits of the Zambesi basin, from Sumbu in the Mwanza valley, and those of the Rift valley which, after having been mapped, are to be tested by drilling. The calcareous clays from Lake Malombe are being considered for possible use in the manufacture of cement. Graphite occurs in the Neno and Dowa districts, and ilmenite and rutile in the Port Herald district. Mineral rights over an area approaching one-half of the Protectorate are held by the British South Africa Co., whose approval is needed for mining in their areas. Large numbers of the population of about 2,500,000 (there are at present only some 4,000 white residents, including officials) are working in the mines of the Rhodesias and of the Rand.

Economic development has been confined mainly to tobacco and cotton growing and, more recently, to the cultivation of the Tung tree, and there are several secondary industries of local importance; however, it is likely that the development of Tanganyika, including the construction of a harbour and railway line at Mtwara, and the expansion of the port of Beira in Mozambique will, in the not too distant future, lead also to further industrial and mining development in Nyasaland.

### British Standards Exhibition

The British Standards movement attains its Golden Jubilee this year and as a part of the celebrations, an exhibition under the title of "British Standards—the Measure of Industrial Progress," supported by practically the whole of British industry, will be held at the Science Museum, South Kensington, during the two weeks beginning June 18, 1951.

As Britain was the first country to put industrial standardization on an organized basis nationally through the British Standards Institution, it is fitting that the first exhibition devoted to this subject should be staged in London—and during the Festival Year.

The advantages derived from standards and standardization will be graphically presented, and each industry will show how standards have simplified production, reduced costs and maintained quality, and how, in turn, they have benefited the users of that industry's products.

The exhibition will also show how research at one end of the production chain, and quality control at the other, are linked with and helped by standardization. Special features of this exhibition will include apparatus used in testing for compliance with British Standards.

### Turkish Chromite Developments

Readers of our article on "Mining Developments in Turkey" (see March 22, 1951, pp. 273-274) will be interested to learn that according to a usually reliable U.S. source, the chrome flotation plant at Guleman, Turkey, which was completed in the late spring of 1950, cannot operate at capacity because of inadequate water supply. Additional investment is required for pipeline, pump, and power facilities to obtain a sufficient flow of water to operate the mill. The plant was designed to produce approximately 30,000 tonnes of 48 to 52 per cent concentrate annually, but production is reported to be less than half this quantity. Ore reserves of the Guleman mine are estimated at 400,000 to 650,000 tonnes of proved ore, and about 1,000,000 tonnes of probable ore.

The Sori Dag mine, which opened in June, 1949, is producing at the rate of approximately 40,000 tonnes of chromite annually. The most reliable estimates place reserves at about 250,000 tonnes of chromite. The Palu project, 15 to 18 kilometres north-east of Guleman, contains, according to latest estimates, about 60,000 tonnes of proved ore. The Eti Bank is investigating the deposit; however, the E.C.A. engineers believe that the ore potential in the deposits does not exceed 250,000 tons. A loan contract was signed in April, 1950, for \$134,000 plus £T.170,000, by E.C.A., and a private producer, for the development of the latter's property. Orders for about \$100,000 worth of equipment have been placed. There are no reliable estimates of ore reserves of the independent producers. A tabulation of the reserves of 18 private producers places total workable reserves within these concessions at about 700,000 tonnes of metallurgical-grade chromite.

### Yugoslavia to Expand Aluminium Production

According to reports to hand from Yugoslavia, an extension of the country's largest aluminium factory, situated near Shibbenik, in Dalmatia, has started recently. It is proposed to double the capacity of this plant in order to make it possible to process increasing tonnages of Yugoslavia's rich bauxite deposits within the country, thus avoiding the export of a large proportion for processing abroad. (For further details regarding Yugoslavia's bauxite occurrences, see "Mining Developments in Yugoslavia," on p.220 of the March 9, 1951, issue of *The Mining Journal*.)

In addition, the construction of a new aluminium rolling mill will begin shortly near the site of this plant, to produce sheets, wire and casts in sufficient quantities to cover home needs and also to provide an export surplus.

At the same time, a large aluminium plant is reported to be under construction at Strinisce, in Slovenia; furthermore, erection of a third works is planned in Hercegovina. When these projects are completed, Yugoslavia's aluminium production, which amounted to 1,700 tonnes per annum before the war, will be raised to about 13,000 tonnes a year.

However, in spite of this increased aluminium production, Yugoslavia will continue to export large quantities of bauxite, reserves of which are estimated at over 100,000,000 tonnes.

## Manganese in India

(From Our Own Correspondent)

Colombo, May 3

Hope for success in aiding India to find and develop mineral deposits under President Truman's famous Point Four Programme has been expressed by the U.S. Secretary for the Interior, Mr. Oscar L. Chapman, who said recently that his department had arranged for three or four geologists to assist the Indian Government's search for mineral resources in Orissa State.

### POINT FOUR PROGRAMME

To work on a Point Four manganese investigation project in Orissa, Mr. John A. Straczek, minerals geologist, has recently arrived in India, and is already examining the manganese belt near Nagpur; in addition, he will also study the lead deposits and zinc deposits in Rajasthan. Mr. Straczek intends to obtain a general picture of these manganese deposits in order to select one area for detailed study and mapping for the next field season beginning in October.

In connection with the manganese project under Point Four it is of interest that production of manganese ore in India has been steadily increasing during the past few years. As compared with a total production of 252,926 tons for undivided India in 1946, production of the Indian Union in 1948 and 1949 was 525,876 tons and 645,825 tons, respectively. The value also increased from about Rs.5,500,000 in 1945 to Rs.17,800,000 in 1948 and Rs.39,400,000 in 1949. Figures for 1950 are not yet available.

A similar increase took place in exports in the last three years. As compared to a total export of 363,482 tons in 1948, exports during 1949 and 1950 were 613,907 tons and 728,280 tons, respectively. Of the quantity exported, the greater part went to hard currency areas, the figures for the three years beginning 1948 being 221,496, 411,642 and 561,196 tons, respectively.

### U.S. FIRM TO ERECT SMELTER

A manganese plant, estimated to cost over Rs.10,000,000, will soon be set up in Orissa by an American firm to smelt a minimum of 25,000 tons of ferro-manganese annually. This is the outcome of negotiations between the Government of India and the Brainard International Co. of the United States. The factory is expected to be completed by the end of 1952.

The U.S. firm is prepared to provide the entire capital required for the plant, if necessary, but provision has been made for the participation of Indian capital, if forthcoming, to the extent of 49 per cent with the Government of India having an allotment of ten per cent of the subscribed capital and representation on the board of directors. An Indian company will be registered for this purpose.

It is expected that the new company will start preliminary operations by September this year. Meanwhile, technical advisers of the firm will arrive shortly in India to prepare detailed estimates, select the site and determine the question as to whether the plant should have electric or blast furnaces.

As soon as the preliminary steps to start mining and manufacturing operations have been taken, the company will be allowed to export up to 100,000 tons of high-grade manganese ore from the deposits under its control.

Dr. Wm. D. Johnston, chief of the U.S. Geological Survey's Foreign Geology Branch, has returned to the United States from India. He represented the U.S. Government and the Geological Society of America at the centenary celebrations of the Geological Survey of India in Calcutta and conferred with Indian Government officials on Point Four geological projects.

## Australia

(From Our Own Correspondent)

Melbourne, May 1

Production figures for the year 1950 show a marked decrease in gold production for the 12 months, compared with 1949. The decrease in total production was 38,102 f.oz., the year's output being 850,955 f.oz. against 889,057 f.oz. in the previous year. Queensland production increased by 10,984 oz. to 87,266 oz.; Tasmania by 2,573 oz. to 14,725 oz.; and the Northern Territory advanced by 5,279 oz. to 35,060 oz. New South Wales output was lower by 8,765 oz. at 43,028 oz.; Victoria dropped back by 8,939 oz. to 59,487 oz.; Western Australia, with 610,333 oz., was 38,092 oz. less than the previous year, and South Australia, with a production of 1,056 oz., showed a decrease of 1,142 oz. Value of the output exceeded £A.13,000,000, an increase of about 20 per cent on the previous year's value, due to the increase in price to £A.15 9s. 10d. per oz., but of course, the only true measure of production is ounces. Operations in all states were affected by shortage of labour, which continued to be acute; another factor in decreased output was the closing down of mines at Bendigo, Victoria, and elsewhere. A cause of lower production in Western Australia was a dispute over the adjustment of piece-work contract rates, which lasted from February to May, 1950.

### PRICE OF TIN

There has been improvement in the position of the tin producer brought about by payment from a pool established at the beginning of the year. The fixed price to producers is £A.840 per ton, and the revised policy provides for a payment from the pool of an amount to be fixed each month. For tin sold in January, the bonus was £50 per ton; for February sales, £75; and for March the bonus was £100 per ton. The bonus for April is expected to be £160 per ton. This increased payment, by bonus, will be of great benefit to existing mines and the rate of increase will do more than meet the rapidly rising cost of production. Even with this assistance, the tin producer still receives much less than world parity for the metal. Unfortunately, the price increase to £A.1,000 per ton will do little to increase production by the establishment of new mining companies or extension of operations by existing companies, for the restraining factors must continue to be labour shortage, scarcity of all materials, and the long delays in obtaining plant and equipment.

### WESTERN AUSTRALIA

The Greenbushes tinfield, in the south-west of the State, has been a producer of some importance, and consideration has been given to increased activity there. The Broken Hill Proprietary Co. has completed a geological survey of the field, but it appears that the company is not interested in commencing mining operations at present. One company and several syndicates are working in the district.

Latest report from Western Mining Corporation advises that construction and preparatory work by Great Western Consolidated are progressing favourably. At the Copperhead mine the main shaft has been sunk 65 ft. for the month to a depth of 602 ft. and temporary winding plant is in use to a depth of 410 ft. The electric skip winder is being used for sinking. Commencement of production by the company is awaited by investors, for it was expected that a substantial premium in share prices would immediately follow the flotation; consequently, there were heavy applications much in excess of the shareholders' ability to pay calls, which resulted in heavy selling and depression of the market price, from which there has not

been full recovery. At New Coolgardie Gold Mines, the main shaft at the Surprise Mine has been sunk to a depth of 504 ft., at which level crosscutting is in progress. At the company's Barbara Mine, driving at No. 3 level has advanced 55 ft. west, to 180 ft., on the north lode, values from 123 ft. to 175 ft. being 25.1 dwt. over a width of 49 in. A south crosscut off this drive was advanced to 22 ft.; assays from 5 ft. to 15 ft. were 30.0 dwt. Work in the south lode east drive advanced to 129 ft., the 21 ft. driven being in low values. At the company's Callion Mine, the main shaft was sunk 48 ft., to 326 ft. At No. 2 level, a winze at 424 ft. south of the main shaft, in the southern section of the ore shoot, was re-started at 32 ft. and 19 ft. of sinking to a total depth of 51 ft. gave an average assay value of 89.0 dwt. gold per ton.

At Central Norseman Gold Corporation, sinking of the Regent shaft was advanced 34 ft. to a total of 2,890 ft. in country, and preparations for cutting the plat at No. 29 level were proceeding. Good values generally were reported from development work. At No. 27 level, the section 56 south drive was advanced 159 ft., to 337 ft., south of the 6040 winze on strong reef, 76 in. wide with an average assay value of 18.3 dwt. gold per ton. The section 7040 winze from the same level was sunk from 19 ft. to 22 ft. in ore, averaging 10.1 dwt. over 52 in. The section 72 north drive was extended 30 ft., to 270 ft., on narrow reef with an average assay value of 7.7 dwt. over a width of 20 in. Good ore continues to be exposed in the corporation's adjacent Princess Royal Mine. At No. 4 level the section 282 north drive was advanced 10 ft. to 70 ft. on narrow reef, 29 in. wide, but values were 40 dwt. gold per ton. Ore broken in stoping and development totalled 462 tons and the average assay value was 31.3 dwt. per ton. The No. 7 level section 280 north drive was on strong reef, 95 ft. driven assaying 8.6 dwt. over a width of 57 in.

Production by the Western Mining Corporation group for the year ended March 31, was: Gold Mines of Kalgoorlie, 163,115 tons ore for 42,614 f.oz. gold, or 5.5 dwt. per ton; New Coolgardie Gold Mines, 41,127 tons ore for 20,188 oz. gold or 9.8 dwt. per ton; Central Norseman Gold Corporation treated 153,928 tons ore for the recovery of 41,880 oz. gold, or 5.4 dwt. per ton.

### TASMANIA

Wolfram production has had an important influence on the finances of Aberfoyle Tin. Originally, wolfram was of secondary importance to tin, and in the 1949-50 period of 38 weeks, contributed 21 per cent to the value of the output. In the same period of the current year, 344 tons of tin concentrate realized £A.211,296, and 107 tons wolfram concentrate realized £A.170,508, with, in addition, 104 tons wolfram residues valued at £A.101,248. The mine is opening up very well. The wolfram content of the ore has always been subordinate to tin, but in the two lowest levels, now being opened up, there has been an increase in the wolfram content, tin remaining practically the same. The Aberfoyle mine is Australia's largest tin-wolfram lode mine.

There have been statements from time to time of Government assistance to the mining industry. These statements have now been confirmed by the passing of a Bill in the State Parliament to provide up to £A.200,000 over a period of seven years, which will be in addition to the usual appropriation for the Mines Department. An exploration programme will be commenced, which will require an increase in personnel. Many mineral belts in the island are considered by authorities to be merely scratched over, the principal of such areas being that lying between Port Davey and Macquarie Harbour and in the Gordon Valley, in the south-west corner. Attention will also be given to areas of the north-west coast. The main object is to obtain data which will assist and guide private enterprise in the investment of capital in mining projects.

## Dust-free Rock Drilling

The problem of dust suppression in mining has for decades occupied the attention of scientists, engineers and forward-looking mine managers. Various methods have been introduced, including, *inter alia*, the injection of water at high pressure into coal seams prior to breaking, as practised in some collieries in Great Britain. In the United States, a new dust control problem has arisen as a result of roof bolting in coal mines because water can seldom be fed into the vertically drilled bolt holes. Therefore, water injection to control dust in mining has not proved to be satisfactory and efforts have, over a considerable period, been made to find a dry dust elimination method.

Needless to emphasize, a satisfactory solution of this problem is of the utmost value in the fight against miners' occupational diseases caused by dust—both a social and economic problem—especially at a time when the best use of our limited mining manpower has become of paramount importance.

World-wide interest has, therefore, been aroused as a result of the announcement, made recently by the British firm of Holman Bros., Ltd., Camborne, Cornwall, that, after over five years of experimental and development work, it has succeeded in producing a dust-free rock-drilling equipment—the Dryductor.

### A SIGNIFICANT ANNOUNCEMENT

This significant announcement was made by Mr. A. T. Holman, a member of the firm, in the course of a discussion held at a general meeting of the Institution of Mining and Metallurgy (Col. L. C. Hill, the president, in the chair), of an important paper by Mr. J. T. McIntyre, entitled "Engineering Review of Silicosis Prevention," presented at the December, 1950, meeting of the Institution and published in its *Bulletin* (No. 529). (The discussion referred to appeared in *Bulletin* No. 531.)

In view of the importance of the successful development of dust-free rock-drilling equipment, which has not merely concluded a stage in mining equipment production, but, more important still, has opened up new prospects, it appears to be opportune to give, firstly, details of the historical background, and, secondly, particulars of how the Dryductor operates.

The company's earliest effort was made in 1881, thirty years after the invention of the first percussive rock drill by Jonathan Couch. Machine drilling undoubtedly ended the age-long drudgery of the miner and, since compressed air helped to ventilate the mine and to reduce its temperature, it generally improved his working conditions. However, at the same time, it vastly increased the quantity of dust released into the atmosphere. In 1902, the Government Mining Engineer of South Africa reported that of 1,177 rock-drill men employed on the Rand before the Boer War, 225 had died of phthisis.

The early rock drills used no water or other device to suppress dust. Miners wishing to lay the dust adopted the little effective method of pouring water from a tin into the drill hole. At the turn of the century, the spray was introduced, but, unfortunately, the miners frequently neglected to use it.

At the beginning of the century, an important step forward was made with the introduction of the hammer-type drill, together with the hollow drill, which permitted the passage of a mixture of water and air for washing out rock cuttings from the drill hole and for laying the dust.

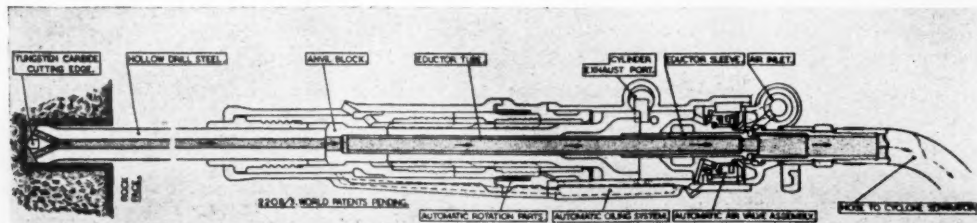
### PREVENTING DUST DISEASES

In 1926, a considerable advance was made on the Witwatersrand in the prevention of dust diseases by the prohibition of the use of machine drills having internal water tubes without release ports being provided in the front head of the drill. This eliminated the danger of bubbles containing grains of dry dust being released into the atmosphere. To-day, thousands of these vented type rock drills are in use on the Rand, a large proportion of them made by Holman Bros., which firm pioneered a further great step towards dust-free rock drilling. In May, 1945, the company's research and development department began working on the principle that it would be better to extract dust as it is made than to allow it to come out of the hole. At first, experiments were conducted with a system whereby the dust was drawn through the hole in the drill steel, from the point where it was created, through the side of the shank, and blown by a form of ejector to an exit at right angles to the drill. This was found to be impracticable, as the dust tended to build up at the point of transference from the drill steel or drill to the atmosphere.

Research then led to the conclusion that the dust should not be interrupted in its passage through the drill steel and rock drill to a point where it could be satisfactorily disposed of.

Attention was drawn to this system in an article written by a member of the firm, received for publication on August 7, 1946, and published in the January, 1947, issue of the *British Journal of Industrial Medicine*, of which the following is an extract:

"Yet another new development which has distinct possibilities is still in the experimental stage. This is the extraction of the dust created during drilling, through the hollow steel normally used for passing water to the cutting edge. The eductor system was developed for the Royal Engineers before the war to remove spoil from saps in trench warfare in a silent manner. In the final development small stones, gravel, earth and sand were educted over 1,000 ft. in length to varying heights, and the system was officially adopted. In the present application, the coarse dust can be removed by a cyclonic separator, and the finest and most dangerous dust transmitted to a safe place for disposal. Under this system,



Cross-section of the Holman Dryductor

no water is required near the working face and thus working conditions can be dry and free from damp."

In April, 1947, an important conference on "Silicosis, Pneumoconiosis and Dust Suppression in Mines" was held in London under the auspices of the Institution of Mining and Metallurgy and the Institution of Mining Engineers. Attention was again drawn to the research being carried out by Holman Bros., and as will be seen by the extract of the remarks made at the conference by a member of the firm, the project was offered to the industry as a whole to develop.

"On this problem of dry drilling, our research department has investigated the extraction of dust through the hollow drill steel and we have had most encouraging results. We investigated also the patent position and found that old, obsolete patents prevented any possible protection. In any case, I would suggest that this matter is one for investigation by the whole industry, rather than for a single manufacturer with limited resources. We have proved that all the dust can be extracted. The coarse dust can be separated by a cyclone collector and be deposited in a nearby container, and the very finest dust below  $5\mu$ , can be conveyed by a pipe to a safe place or to the surface for disposal. It seems that a certain amount of work has been done in the past on this problem in various places, but no fundamental research has been carried out.

"If a national research body could be developed to undertake this task it would be most valuable, as it is the one positive way in which the very finest dust can be caught as it is made and prevented from getting into the atmosphere. My firm would be very glad to place any information they have at the disposal of such a body if formed."

This offer was not accepted.

However, research was, nevertheless, continued at Camborne, and certain fundamental principles were discovered and became the subject of patents taken out by Holman Bros., and after six years of concentrated effort, the company was able to announce its completely dustless rock drill—the Dryductor.

Leading particulars of the Dryductor drill are: bore  $2\frac{1}{4}$  in., stroke  $2\frac{1}{4}$  in. and weight 60 lb. It is supplied complete with a 1 ft. 6 in. length of special extruded hose. World patents have been applied for.

In the course of his announcement before the general meeting of the Institution of Mining and Metallurgy, referred to above, Mr. A. T. Holman stated that his firm had come across a patent brought out in 1923 by a Berlin inventor for extracting the dust through the steel to the atmosphere through a hole in the shank. Although they did not know anything about the German experiments at the time, that was the principle on which his firm had started work. They had found it an impracticable proposition, however, because the dust tended to build up at the point of transference. They came then to the principle, which he was sure was fundamental, that the dust must

not be interrupted in its passage through the steel and drill to the point at which it could be disposed of.

That was the line they had followed for the past three years. A large diameter tube was placed right through the centre of the rock drill, the hole through which was very much larger than was normally used for water. That communicated with a hose-pipe exactly in line and the dust was transmitted to some means of collection close by or at a distance, as desired. That particular problem was tackled in various ways. One was by having a cyclone equipment close by, up to 95 per cent of the dust being caught by that while the balance was taken by a filter beyond. In another method, that dangerous dust, of four or five microns in size and less, was transmitted by a small pipeline, taken a suitable distance away and disposed of into the upcast shaft or passed through a wet screen. A third method was to transmit the whole of the dust. They had, at the moment, an equipment by which they were transmitting it over 1,000 ft. to a disposal point, none of it being separated close to the rock drill. (See diagram.)

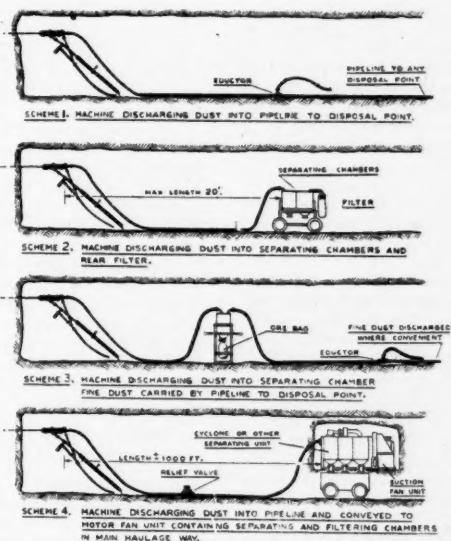
"There is of course the disadvantage," Mr. Holman continued, "of the conduit from the mining point of view, but it has to deal only with a vacuum. It does not involve any more expense than that of putting in a water main—if as much. Conduit of the electric cable type is very much cheaper and it is of course also very much lighter. The system has positive advantages from a drilling and silicosis point of view. There is nothing to prevent a man from turning off the watering device of a wet drill or tampering with it, but in the case of the new dust extractor immediately the suction ceases, the machine ceases to drill.

"When drilling, the whole system is under vacuum conditions and therefore the fine and most dangerous dust cannot escape into the atmosphere. I think it rather an important point, having mining psychology in mind, that the machine cannot release

dust when it drills and it cannot drill unless the suction is in order and the dust is being removed."

At this discussion, in reply to a question by the president, it was also emphasized that, when the dust was from an ore body, it would be bagged from a bin at a suitable point, the bags being sent to the surface for treatment. This lends itself to a simple form of the sampling of ore bodies.

It is the practice, when drilling wet, to remove the sludge from the hole prior to placing the firing charges by means of a blast of compressed air. This discharges into the atmosphere dust, which is left to dry and becomes a menace during later operations. With the Dryductor, this is unnecessary: all the dust is removed while drilling is taking place, there is no sludge and when the drill steel is withdrawn from the hole no dust remains; therefore, the hole can be charged immediately. The fact that all dust is removed from the hole immediately it is made also increases the drilling speed of the machine. A new face is presented at each blow as there are no chippings or sludge left in the hole.



Four of the various schemes for use with the Holman Dryductor drill, which may be either airleg or cradle mounted

## Pakistan's Minerals

In a review of the activities and progress of the Geological Survey of Pakistan during 1950, broadcast recently over Radio Pakistan, the Director of this department, Dr. H. Crookshank, gave some details of the results achieved by parties which had been working in Swat in Kohistan, in Chitral, and in parts of Baluchistan. Commencing with gold, he referred to the fact that it had long been known in the Chitral River. During the last two seasons geologists had been gathering information and they reported that this metal was everywhere present in the Chitral river gravels. In rich patches, which were of small extent, the gravel yielded over 20 grains of gold to the cu. yd. On the average, 2 or 3 grains per cu. yd. of gravel were present. The gravel occurred in very large quantities and was capable of working by a dredger or dragline excavator, provided that the machine could deal with occasional large boulders. The report dealt with only surface gravels accessible to workmen when the river was low. It did not deal with the much larger quantities of gravel below water level. Before a decision could be reached about the working of gold in Chitral it would be necessary to test these gravels in depth, a job which required expensive equipment. The surface indications were, however, distinctly promising, and justified hopes of better results in depth and it was quite possible that gold dredging in the Himalayas would ultimately prove an economic success.

"Pakistan, unfortunately, contained no gem deposits, there was, however, a possibility that gem stones would be found in the high Himalayas because the pegmatite rocks of that region often had cavities in which minerals could develop to perfection.

"After gold and gem stones, the public interest is in the old established metallic minerals, such as lead and copper. Parties working in Swat, Chitral, Gilgit, and Fort Sandeman have recently brought in much information about these. Lead deposits exist in remote areas, but, as far as we can estimate, are of trifling size; and not the sort of deposit required for modern industry. Very recently, archaeologists digging in a mound near Quetta found a good specimen of cerussite. What the ancient people used this ore for is difficult to say; possibly, like the Chinese in quite recent times in Burma, they were recovering the silver which is always associated with lead ore, and throwing away the lead. The great antiquity of the lead industry in Baluchistan makes me hope that somewhere there may be big deposits of lead ore, formerly worked, but long since forgotten, which may ultimately prove valuable."

Parties working in the Himalayas often reported small deposits of copper, but usually in such inaccessible areas that they had little economic interest. An exception was the copper ore north of Fort Sandeman, which would be fairly accessible.

### IMPORTANT INDUSTRIAL MINERALS

Turning to the important industrial minerals such as bauxite, chromite, manganese, antimony and uranium ore, Dr. Crookshank said that recent work in Baluchistan had led to the discovery of a thick belt of laterite which might locally yield bauxite. Unfortunately, bauxite was one of the few minerals which could not be recognized without the help of a chemical laboratory, and the Geological Survey of Pakistan had so far been unable to get the necessary equipment. In addition to the well-known chromite deposits near Hindubagh, a number of small deposits had recently been seen north of Fort Sandeman. Manganese ore had also recently been reported in Las Bela in thin lenses. If of good quality, it probably could be worked, as the world price of this ore was very high, and the deposits

were not too distant from Karachi. Ores of antimony were well known in Chitral. The deposits were small but probably numerous, and should be workable. During the war, efforts to work this mineral and smelt the ore in Bombay were made, and had some success, but they were greatly handicapped by the high cost of transport.

The Geological Survey of Pakistan had so far made no attempt to locate uranium ore. They had, however, obtained two Geiger counters and were setting forth shortly to search for uranium ores. While Dr. Crookshank thought that it was most unlikely that deposits of primary ore occurred in Pakistan, the Dominion was just as likely to have good secondary deposits of uranium as any other country, and he hoped to be able to report within a year or two that deposits of this type existed.

A considerable part of his review was devoted to lignite, about which nobody bothered when Bengal coal was cheap and readily available—but this had now changed and the whole country was suffering from want of cheap fuel. It was too early to say whether "this strange black mud," which was found exposed along the country's rivers when the waters were low, could take the place of coal, but there was hope that, if properly handled, it might perform many of the functions of coal.

"The Geological Survey are now busy prospecting an area near Harashpur not far from Brahmanbaria. Last year they were able to show a minimum of 9 ft. of lignite over a large area below a few feet of alluvial clay. This year, with better equipment they have got to the bottom of the lignite and have found 15 ft. to be the minimum thickness. This means that in a very accessible area there are some 200,000,000 tons of lignite. This could easily and cheaply be excavated with a drag line excavator or some such mechanical equipment, designed to work under water."

However, the question of the utilization of this lignite would require a great deal of investigation; all they knew at present was that its grade was rather lower than that of lignite found in Australia and Germany, yet there was hope that the Bengal lignite might in time become a source of cheap electric power. In addition, it might assume considerable importance as a fertilizer, since it contained in the dried state some 3 per cent of nitrogen.

## The Boracic Soffioni

A very interesting paper was presented by Dr. Ing. Alfredo Mazzoni before the Institution of Structural Engineers in London recently, describing the Tuscan Boracic Soffioni and their development at Larderello. These deposits have been noted on many occasions beginning with Lucretius' mention in the Fourth Book of *De Rerum Natura*. In the period of the Renaissance, descriptions of the phenomenon were given by a number of writers. The earliest industrial use made of the soffioni seems to have been in the manufacture of alum, boracic acid and copper, by the Florentine woollen industry. In 1777 the German chemist Hoefer detected the presence of boracic acid in the Lagoni of Monterotondo and Castelnuovo, and subsequently a process was developed by Paolo Mascagni to extract the boric acid by evaporation from the lagoni. He also initiated the idea that the heat of this volcanic phenomenon could be turned to economic account. Various companies in the course of time pursued these investigations, and in particular, a Leghorn firm, Laderel and Co., laid out artificial lagoni near Monte Cerboli, which were christened "Laderello" by the Grand Duke of Tuscany, Leopold II, in 1846. The refinery technique was improved by stages, but remained substantially unchanged to the beginning of the present century.

Generally speaking the phenomena of the soffioni resembles the geysers of Iceland, the Azores, America and New Zealand, but unlike these, which alternate gushes of

vapour and boiling water, the *soffioni* eject almost exclusively water vapour. Much discussion has developed over the origin of the *soffioni*, no conclusion being as yet entirely satisfactory. While they are clearly manifestations of underground activities, there remains to be explained their high temperature of 400°F., and pressures which may exceed 30 atmospheres. It is presumed that the vapours originate from the magmatic mass situated in the volcanic region of Monte Amiata, Roccastrada, Sassoforte and Campiglia Marittima, where the trachytic magmas have come to the surface with the lava, and the high degree of radio-activity of the vapours supports this theory.

#### MAGMATIC RESERVOIR

Geological speculation favours the belief that the magmatic reservoir from which the gases are derived is situated at a depth of about 16,000 ft. An essential condition is the formation of a zone holding vapour under pressure, created by the existence of a covering stratum of eocene shale forming a practically impervious anticline. The discharge of the gases is facilitated by borings which perforate the covering strata. The vapour emerges at a temperature of between 280°F. and 420°F. In any case, the vapour emerges at surface at a temperature much higher than that of fully saturated vapour at the same pressure. Measurements of the pressure in enclosed borings vary from 5 to 30 atmospheres or more, according to locality. The gas content of the *soffioni* consists mainly of organic anhydrides in the order methane and hydrogen, sulphurated hydrogen and nitrogen, and the composition is constant.

Boring methods and machines have been progressively improved, largely following the development of oil-boring technique, but the high temperatures encountered offer a peculiar difficulty not met with in oil boring. To-day, Larderello employs rotary drills for borings of from 4,900 to 6,300 ft. with an initial diameter of some 20-28 in. New machines have now been purchased from the Oil-Well Supply Co. to reach a depth of 7,400 ft. with a surface diameter of 28 in. The advantage of the rotary drill is that cores can be recovered. For shallower depths, percussion drills are also employed.

As it has been found that the vapour flows best between two strata of the Eocene-Rhétian and the Rhétian-Permian periods, the study of stratification is of great importance. Geophysical studies have been made, but without success so far.

#### ECONOMIC UTILIZATION OF THE SOFFIONI

The *soffioni* yield about 5,500,000 lb. of vapour per hour, which are utilized for the generation of thermoelectric power and for the recovery of chemicals—principally boric acid.

For power generation the vapour is utilized in direct intake turbines or indirectly by heating boilers to deliver pure steam to the condenser turbines at a pressure of about two atmospheres. In the latest plant, installed after the partial destruction of the works by the retreating Germans in 1945, the vapour consumption of the direct intake turbines has been halved to the figure of 21 lb. per kW. and is 32 per cent lower than that of the pure vapour intake turbines.

The production of boric acid by 1944 had reached a total of several thousand tons of crude acid per year, and when the works were reconstructed in 1947 repairs to the chemical plant were carried out in parallel to those to the electric plant and operations improved and simplified.

The Larderello generating stations produced in 1950 1,300,000,000 kW. or five per cent of the total energy generated in Italy, hydraulically and thermally, and represented a saving of about 600,000 tons of coal. This energy output should be increased by 50 per cent when Larderello No. 3 reaches full production.

## Use of Nickel-Hard for Diamond Crusher Plates

The following interesting particulars about the use of abrasion-resistant nickel-chromium white cast iron, known as Nickel Hard, for jaw plates used in crushing boart, are given in an article entitled "Nickel-Hard Crusher Plates for Diamonds," by Mr. R. S. Young, Director of Research at the Diamond Research Laboratory of Johannesburg, in the February, 1951, issue of the *Journal of Metals*.

A large proportion of the world's output of industrial diamonds is sold to users in the form of crushed boart, a term which is applied to the dull grey, green or yellow diamonds found in many fields. Their dark colour and inclusions make them unsuitable for gem purposes, and their imperfect and weak crystal structure usually renders them unfit for wire drawing dies, wheel dressers and lathe tools, but they are widely used in drill bits and grinding wheels on account of their unique hardness and abrasion resistance.

Boart comes to diamond producers in sizes ranging from 1 to 40 mm. diameter. It is crushed to pass through Tyler No. 7 mesh sieve, which has an opening about 2.8 mm. A laboratory-type jaw crusher, similar to those used for ore samples, and a roll crusher, are employed. Since the object in crushing is to leave the diamond particles in the largest size possible, below 7 mesh, jaw crushing is the major operation.

#### NEED TO WITHSTAND IMPACT AND ABRASION

The jaw crusher plates have to withstand the impact and abrasion of diamond. The usual type of unalloyed white cast-iron jaw plates were away so rapidly that they had to be replaced after crushing only 50,000 carats in some cases. In addition, the quantity of abraded iron that had to be separated with a magnet from the diamond powder made this operation tedious. Manganese steel jaw plates, having about 13 per cent manganese, gave a vastly increased life, crushing about 900,000 carats before replacement was required. Manganese steel, however, is non-magnetic and since the small quantity of abraded steel could not be removed from the boart with a magnet, allowance had to be made for this by giving the purchaser a slightly higher caratage than ordered.

About a year ago, on the recommendation of the Diamond Research Laboratory, Johannesburg, the abrasion-resistant nickel-chromium white cast-iron known as Nickel-Hard was employed for these jaw plates. The Type I or regular type of Nickel-Hard, with the following nominal composition was employed: 3.25 per cent carbon, 0.50 per cent silicon, 0.50 per cent manganese, 0.1 per cent sulphur, 0.3 per cent phosphorus, 4.25 per cent nickel and 1.75 per cent chromium. The Nickel-Hard plates were chill cast, and were stress relieved by drawing at 400°F. for four hours.

The results have been satisfactory. Life has been slightly better than that of manganese steel, the Nickel-Hard plates crushing about 1,000,000 carats before replacement is necessary. Since Nickel-Hard is less expensive than manganese steel, the replacement cost is considerably lower. A far greater advantage, however, is that the small quantity of abraded Nickel-Hard can be removed from the boart by magnetic separation.

This is the severest condition of operation in the world for jaw crusher plates. The terrific impact and abrasive forces encountered in diamond crushing may be visualized when it is recalled that the quantity of 1,000,000 carats crushed in the life of such an abrasion-resistant material as a Nickel-Hard jaw plate is only about 440 lb. This weight would represent, for the ordinary type of mine or smelter product, 100 to 150 samples.

## Technical Briefs

### De-gassing a Scottish Colliery

A de-gassing operation was successfully carried out recently at Plean No. 5 Colliery, near Stirling, Scotland, when about 3,000,000 cu. ft. of methane were extracted from the workings within about 48 hours.

In November last, an ignition of gas occurred in the undercut of the main coal seam of this colliery, and the men working in the section had to be withdrawn. Air samples taken showed the presence of carbon monoxide in minute quantities. An attempt was made to blow out the "jet" with Cardox shells, but subsequent analysis of the mine air in the vicinity showed that the carbon monoxide was gradually increasing. The main coal workings were sealed; each seal was 30 ft. in length, and approximately 6,000 sandbags were used per seal. The object was to allow an explosive mixture of methane and air to build up behind the seals, on the theory that, if the original ignition were still present, the resulting explosion would extinguish it. Everyone was withdrawn from the pit for 24 hours. An explosion was heard 12 hours later.

On March 29, a rescue team, using breathing apparatus, went through the stoping between the 20 in. seam and the main coal, to take air samples. These showed 76 per cent methane and 0.3 per cent oxygen, from which it was inferred that no fire then existed in the area.

The next problem was how to get the methane out of the colliery. The situation was peculiarly difficult on account of the proximity of a battery of 45 coke ovens, which stand about 200 ft. from the upcast shaft and the exhaust fan, through which the dangerous underground mixture would be released and dispersed.

A steel chimney, 76 ft. high, was erected in three days over the fan mouth, to lift the escaping gases clear of the fumes and flames from the coke ovens. With the main airways, both intake and return, cleared of methane and the main ventilation circuit restored, the first phase of this ingenious and delicate de-gassing operation was negotiated without mishap. However, the working places in the main coal seam have still to be freed of gas and water.

### Zirconium Metal Production in Britain

Readers of the numerous articles on the importance of zirconium, its production and application, which appeared in *The Mining Journal* during the last few years will be interested to learn that commercial production of zirconium metal has recently been initiated in this country by Murex Ltd., Rainham, Essex. Previously only very limited supplies were available in England and even now full production has not yet been attained. Sheets down to .005 in. in thickness, 6-7 in. in width and 2-3 ft. in length are now being made, and it is expected that sheets up to 12-15 in. in width will be available in the course of the next few months. Rods down to 2 mm. in diameter can be supplied and drawn zirconium wire may also shortly be available.

### New Austrian Grey Alloy Casting Process

The Liezen foundry in Styria, Austria, has, according to a Reuter report from Vienna, developed a new process for the production of grey alloy castings with a silicon content of 13 to 17 per cent. Production has already begun, but tests and development work are being continued in view of the difficulties encountered in producing this type of casting. The new material produced by the Liezen foundry is stated to have an unusual resistance to corrosion greater than that of chrome-nickel steels. Production is to be increased to proportions where it will be possible to supply not only domestic needs, but also foreign markets.

### Du Pont's New Coal-breaking Device

E. I. du Pont de Nemours & Co. has announced the development of a chemico-mechanical device which breaks down coal from a mine face by the force of compressed gas generated by chemical reaction within the device and released mechanically, says Reuter's Wilmington correspondent.

The new non-explosive device, known as Chemechol, consists of a steel tube enclosing a chemical unit. The steel tube is closed at one end by a plug which has electrical connections, and at the other end by a disc held in place by a perforated head. After the tube has been placed in a hole drilled in the coal face, an electrical impulse is used to decompose rapidly ammonium nitrate and other chemicals into a harmless gas. Heat is produced which, after a few seconds, destroys the starter wire, thus breaking the electrical circuit. The chemical reaction continues, liberating gas which builds up to a predetermined pressure; at this point the disc ruptures. The gas rushes out through the ports in the head and breaks down the coal. The tube, refilled in the mine with another chemical unit and disc, can be used repeatedly.

The device is said to produce no flame, cannot be activated by small electrical currents, such as stray currents, nor by high currents such as mine lighting or haulage circuits, and cannot be detonated by blasting caps or high-strength dynamite. Field tests during the past few weeks have proved successful, but further tests are being carried out.

### Shell V.P.I. Paper—A New Rust Prevention Method

A new method of packaging metal components, using a special rust-preventive paper developed by the Shell Co. and called Shell V.P.I. (vaporous phase inhibitor) paper, has proved to be so effective and economical that it has been adopted exclusively by the Austin Motor Co. for its world-wide exports. This paper is coated with a chemical which, by slowly vaporizing, forms a very thin film on metal surfaces and thereby protects them from corrosion. Although moisture and oxygen are necessary for rusting to take place, V.P.I. does not react with or remove either of them, but instead operates successfully in their presence by actually inhibiting their corrosive actions. Even when there is a film of moisture present—as may often occur in a very humid atmosphere—V.P.I. still protects by dissolving in the condensed water and thereby making it non-corrosive. So long as the paper is not more than 1 ft. from any part of the surface of the metal being packed, it can give complete protection for anything up to five years, depending on the type of wrapping used. The use of Shell V.P.I. paper involves only a slight addition to ordinary packaging costs and, moreover, upon arrival at their destination, the goods need not be cleaned as is the case with normal rust prevention methods.

### Ruhr Experiments With New Mine Conveyor Belts

Ruhr coal mines are experimenting successfully with a new type of conveyor belt that goes round curves and follows the ups and downs of underground workings, reports Reuter's correspondent in Düsseldorf. The belt, called the "Remscheid Band," has been used by four collieries for some months with gratifying results. In one mine, the belt runs almost three-quarters of a mile round bends and over uneven spots. It saves time and increases production, the managements of the four collieries say. Besides, it obviates the need for miniature locomotives and wagons for hauling coal from the workings to the shaft. The "Remscheid Band" has a capacity of about 150 to 180 tonnes an hour. The colliery Frederick the Great, at Herne, Westphalia, has already ordered a second belt for its fourth gallery.

## Metals, Minerals and Alloys

Mr. Stokes, Lord Privy Seal, arrived in America on Monday and proceeded to Washington to see Mr. Acheson and Mr. Charles Wilson, and may also see President Truman. He emphasized that the principal subjects of concern were molybdenum, tungsten, zinc and sulphur. The urgency with which Mr. Stokes is proceeding suggests a more positive attitude towards critical mineral products on the part of the British Government. The chairman of the U.S. Munitions Board has again asked Congress for authority to make long-term guaranteed purchase contracts with foreign producers of strategic minerals and metals, with emphasis on the need to stimulate the output of critically important items, particularly tungsten, cobalt and manganese. The adoption of this policy would, he claimed, enable private producers abroad to make substantial capital investment to increase output, and the U.S. Government might be enabled to obtain a steady long-term supply more cheaply than by spot purchases. The materials bought would be used both for stockpiling and for re-sale to industry. Mr. Charles Wilson has forecast that one year of civilian restraints, say from July 1 for the ensuing 12 months, would carry the country over the "hump" of the defence programme.

U.S. importers have been granted the option of extending the effective date of a new ceiling price regulation to the end of the current month. May 9 had previously been the final date, to submit particulars of their landed costs and sales charges.

**Copper.**—The Copper Duty Suspension Bill having been passed by both Houses of Congress, has been sent to the White House for the President's signature. As soon as this has been done, the agreement to pay an extra 3c. a lb. for Chile copper is to go into effect. Under the agreement Chile is to increase copper production by 47 per cent from 380,500 s.tons to 550,000 s.tons a year. The companies will finance the cost of increase and Chile will consider granting Anaconda and Kennecott tax concessions. The agreement is to apply to shipments on and after May 8. By way of welcoming the successful completion of the negotiations, the workers at Chuquicamata, who have been on strike for nine days, agreed at a meeting at which were present a representative of the President, labour leaders, and spokesman of the operators, to return to work last Monday.

The U.S. Administration, however, is not expected to increase the "official" domestic price of 24½c. and is considering a Government subsidy to finance the additional 3c. on imports of Chile copper. Other countries having surpluses for export are expected to request the same price benefit. Whether they would get the same subsidy remains to be seen. If not, their exportable supplies will, no doubt, go elsewhere. Expanding defence orders are said to be forcing copper, lead and zinc supplies into the tightest position since the beginning of the Korean War. Though first quarter production increased 22,000 s.tons over the first quarter of 1950, imports declined by 29,000 s.tons. May sales in the first week of the month were said to have aggregated 84,523 s.tons, with 11,640 s.tons already engaged for June. By the end of next month, however, summer vacations will begin to take effect in most of the fabricating branches and the Government measures for curtailing civilian use should come into effect after the turn of the year.

The President of the Consolidated Coppermines Corporation, Mr. C. D. Tripp, characterized the U.S. copper supplies situation as rather desperate. The world price was now about 4-5c. per lb. higher than the U.S. domestic price.

The Copper Institute figures for April give the United States crude production as 91,055 s.tons (91,243 s.tons in March). Refined output was 103,494 s.tons (112,933 s.tons). Deliveries are computed at 114,744 s.tons (116,793 s.tons). Stocks at the end of April were 52,800 s.tons (55,609 s.tons at end March). Elsewhere the Copper Institute reports world production in April at 104,831 s.tons (100,946 s.tons in March). Refined stocks at the end of April are given as 164,588 s.tons (161,720 s.tons in March). Deliveries in April were 87,829 s.tons.

The American Bureau of Metals Statistics reports export of copper in all forms from the Belgian Congo last year at 167,007 tonnes.

**Lead.**—The situation in the United States is strained, with many consumers willing to pay up to 22c. per lb. for duty paid foreign lead, as compared with the official price of 17c. for domestic. Sellers are not expected to open their June books until the latter part of the month, by which time June defence orders will have been booked. Those already accepted for June greatly exceed the mandatory 20 per cent allocation. Stocks at the end of April were reported as 19,365 s.tons as against 79,172 s.tons a year earlier. Canadian lead has been selling on the basis of 20½c. f.a.s. Vancouver. Receipts of lead concentrates for smelters in the first quarter of the year were 132,003 s.tons against 137,219 s.tons a year earlier.

A keen demand continues for Mexican lead in the U.S. market restricted only by the tightness of supplies. Prices remain firm at 20/22c., f.a.s. Gulf Ports. The Copper-Lead-Zinc Committee of the International Materials Conference is expected to produce concrete proposals by the middle of June.

**Tin.**—Towards the end of last week the Reconstruction Finance Corporation reduced its selling price to \$1.39 per lb., their third consecutive cut. The opinion had been previously expressed that the R.F.C. would have to increase its prices in view of the interim contract with the Bolivians, understood to have been based on Singapore prices. The reduction, however, suggests that the policy with which the R.F.C. has been credited, of seeking to influence the market in a downward direction, is still their intention.

So far the cessation of tin shipments to the U.S. in March and April does not seem to have sensibly affected Eastern prices. Other countries had to go short with America the chief buyer, and lack of exchange also was a restraining factor. Ultimately, however, the tin supply pipe-line should be filled and then we shall be better able to judge as to the probable stability of the current price level. *Per contra*, if the price were to fall substantially, the American Government might re-enter the market, so as to prevent any undue price fall reducing world output.

Following the recent Bolivian Elections, a military junta is reported to have forced the resignation of the President, Señor Mamerto Urriolagoitia.

**Zinc.**—Although U.S. sellers opened their June books at the beginning of the month supplies proved inadequate for the demand, especially for high grade, and many defence orders for June metal could not be satisfied. U.S. production in April was 77,813 s.tons (80,450 s.tons in March)—comprising prime Western 37,848, special high grade 23,045, high grade 15,653 and intermediate 1,357 s.tons. Shipments to domestic users were 69,113 s.tons, which with 2,821 tons to stockpile and 2,473 tons for export and drawback, brought total shipments to 74,407 tons, a reduction on the month of some 6,000 tons. Stocks improved to 14,511 tons.

**Sulphur.**—The Sulphur Committee of the International Materials Conference has been the first to make a report. It finds that the world's supply of sulphur is likely to be at least 1,000,000 tons short of requirements, and the shortage may become more intensified unless more vigorous

steps are taken immediately. Increased production of pyrites, recovery from roaster and industrial gases and the more extended use of anhydrite and gypsum will necessarily take time, and conservation of use is the only immediate practical recourse.

**Tungsten.**—The wolfram market remains steady at around 520s. per unit c.i.f. Portuguese speculators are said to be holding a considerable quantity of wolfram bought at higher prices in the hopes that U.S. ceiling prices may be raised, but this seems unlikely.

## The London Metal Market

(From Our Metal Exchange Correspondent)

The market has been absolutely featureless for the last few days owing to the combination of the Whitsun holiday and the lack of interest amongst buyers in general. The R.F.C. sprang a surprise on Thursday, the 10th, when they reduced their selling price to \$1.39 per lb. This caused a momentary weakness in London, but as the Eastern price did not fall over the week-end, the loss was soon made good. The market is offering resistance at the present level, and as long as the Eastern market maintains its present daily turnover there appears to be little fear of any steep fall in price. Eventually, however, the Americans will have to start buying again, and the long-term price trend must be governed by whether such buying can be timed to coincide with a slackening off in other directions, or whether two buying movements will take place simultaneously. In the first case, one can expect lower prices, and in the other, higher. It is the general hope that the price will be kept stabilized at the present level, or slightly below, by judicious and well-timed U.S. action.

On Thursday the official close on the tin market was: Settlement Price £1,150, Cash Buyers £1,145, Sellers £1,150; Three Months' Buyers £1,120, Sellers £1,125. In the afternoon the market was firm. Turnover for the day was 80 tons. Approximate turnover for the week was 440 tons.

The Eastern price on Thursday morning was equivalent to £1,146 2s. 6d. per ton c.i.f. Europe.

## Iron and Steel

Perhaps the most remarkable feature of the past week has been the fact that nearly all the steel plants have been kept in continuous operation over Whitsun.

Now that summer is at hand, there are hopes of an acceleration of ore shipments, particularly from Sweden. The position in the Mediterranean ore ports is still difficult, and latest fixtures range around 60s. per ton, which constitutes a serious financial burden upon blast furnacemen. However, hopes are entertained of a progressive improvement in ore supplies.

The foundry trades are encountering difficulties in maintaining production. Seldom are they able to obtain

their full allocations of pig iron, and since cast iron scrap is also in short supply, many units find it almost impossible to make up their normal cupola charges.

There has recently been a run on finished iron as a substitute for steel bars for which delivery dates are lengthening. Unfortunately, the makers of bar iron report a drop in production owing to the scarcity of raw materials. Similar problems confront the re-rolling industry.

### MAY 17 PRICES

#### COPPER

Electrolytic ... .. £210 0 0 d/d

#### TIN

(See Metal Notes above for Thursday's Metal Exchange prices)

#### LEAD

Soft foreign, duty paid ... .. £160 0 0 d/d  
Soft empire, including secondary lead ... .. £160 0 0 d/d  
English lead ... .. £161 10 0 d/d

#### ZINC

G.O.B. spelter, foreign, duty paid ... .. £160 0 0 d/d  
G.O.B. spelter, domestic ... .. £160 0 0 d/d  
Electrolytic and refined zinc ... .. £164 0 0 d/d

#### ANTIMONY

English (99%) delivered,  
10 cwt. and over ... .. £390 per ton  
Crude, (70%) ... .. £305 per ton

#### NICKEL

99.5% (home trade) ... .. £406 per ton

#### OTHER METALS

Aluminium, £124 per ton.  
Bismuth, 22s. 6d. lb.  
Cadmium, 18s. 3d. lb.  
Chromium, 5s. 3d. lb.  
Cobalt, 15s. 6d. lb.  
Gold, 248s. f.oz.  
Iridium, £65 oz. nom.  
Magnesium, 1s. 6d. - 2s. lb.  
according to quantity.  
Osmiridium, £35 oz. nom.  
Osmium, £70 oz. nom.  
Palladium, £8 10s. oz.

Palladium (scrap), £8 oz.  
Platinum, £27/£33 5s. nom.  
Rhodium, £45 oz.  
Ruthenium, £30 oz.  
Quicksilver, £73 10s. f.oz.  
ex-warehouse.  
Selenium, 25s. nom. per lb.  
Silver (bar), 78½d. f.oz. spot  
and forward.  
Tellurium, 19s. lb.

#### ORES, ALLOYS, ETC.

Bismuth ... .. 50% 14s. lb. c.i.f.  
40% 13s.  
Chrome Ore—  
Rhodesian Metallurgical (lumpy) £11 per ton c.i.f.  
" " (concentrates) £11 per ton c.i.f.  
" " Refractory £10 12s. per ton c.i.f.  
Baluchistan Metallurgical ... £11 11s. per ton c.i.f.  
Magnesite, ground calcined ... £26 - £27 d/d  
Magnesite, Raw ... £10 - £11 d/d  
Manganese, Best Indian ... (Nominal)  
Molybdenite (85% basis) ... (Nominal)  
Wolfram (65%), U.K. ... 520s. c.i.f. nom.  
Tungsten Metal Powder ... 34s. nom. per lb. (home)  
(for steel manufacture)  
Ferro-tungsten ... 32s. nom. per lb. (home)  
Carbide, 4-cwt. lots ... £30 3s. 9 d/d per ton  
Ferro-manganese, home ... £36 1s. 1d. per ton  
Ferro-manganese, export ... Nom.  
Brass Wire ... 2s. 4½d.  
Brass Tubes, solid drawn ... 1s. 10½d.

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## Company News & Views

### Financing the O.F.S. Mines

Despite past uncertainties as to how and where the necessary capital for the O.F.S. mines would be found, fund raising seems in the event to be proving to be one of the least of the mines' problems. It is true that a number of companies have resorted to the raising of loan capital, which is a new departure in South African mining finance, but this may well prove to be to the ultimate benefit of shareholders if the ordinary share capital can thereby be kept lower than would otherwise have been the case once the production stage has been reached. It is also true that the groups have had recourse to new and somewhat unexpected sources of capital, such as the £5,000,000 working capital guaranteed by the Kennecott Copper Corporation for Virginia and Merriespruit and the Union Bank of Switzerland's £4,000,000 loan to the Anglo American Corporation. However, the fact that capital has been readily forthcoming from sources other than those traditionally associated with South African mining finance, is a welcome sign of the confidence with which the future of the O.F.S. is widely viewed.

The raising of capital for the O.F.S. must inevitably be a piecemeal affair; not only because of the large amount of capital required, but also because a developing mine, by its nature, requires successive injections of capital, as the work of development proceeds. Thus, the past ten days has brought news of several further financial steps towards the immediate goal of bringing 13 O.F.S. mines into production. Of these, perhaps the most interesting is the decision of Orange Free State Investment Trust to raise a further £5,000,000, of which £2,000,000 is to be obtained by the offer to shareholders of unsecured convertible notes, while a further £3,000,000 will be forthcoming in the form of loan facilities provided by the Anglo American Corporation and associates. Also of interest is the announcement that President Brand is to raise about £2,500,000 through a one-for-two share offer to existing shareholders. This company has been depending of late on loan facilities from the Anglo American Corporation, and the new issue will, among other things, provide capital for the repayment of temporary loans. Last week it was reported that St. Helena Gold Mines will require a further £1,000,000 and that the Union Corporation has offered to provide this sum as a temporary loan. Further particulars of these three announcements appear under "Company Shorts."

### C.P. Mangane

The report and accounts of Central Provinces Mangane Ore Co. for the year ended December 31, 1950, showed that the net profit for the year, after providing £1,250,000 for taxation, amounted to £514,971 against £372,087. From the £700,617 available, an interim dividend of 1s. per unit and a final dividend of 2s. per unit, together with a proposed bonus of 6d. per unit on the issued capital of £1,000,000 absorbed £350,000. General reserves received £150,000 and after these and all other appropriations were taken into account, the carry forward totalled £176,357 against £185,646 previously.

The directors state that the demand for the company's ore in the world's markets continues to be satisfactory. Mr. Henry Robinson Holmes is chairman. The meeting is to be held on June 6.

### King Island Scheelite Benefits by Higher Tungsten Price

The effect upon the finances of King Island Scheelite 1947 Ltd. of the great increases in the price of tungsten, which has taken place during 1950, has been to raise the gross value of the mine output from £A.20,000 to £A.100,000 per four-weekly period, and in the financial

year ended October 31, 1950, the average for four weeks was £A.33,000. It is understood that the basis of the recent long-term contracts with the U.K. and U.S. Governments is a minimum price, which suggests that the company will receive the full world market price for tungsten while it is above the minimum rate. Mining operations are by open cut, and ore reserves exceed 1,000,000 tons.

## Company Shorts

**Ofsits Plan to Raise £5,000,000.**—In a circular to shareholders of Orange Free State Investment Trust, the directors point out that the company's cash resources are nearing exhaustion, and that they have decided it is desirable to raise at this stage sufficient funds to enable the company to subscribe its share of any new capital required to bring the mines, in which it is interested, into production. It is estimated that the finance required for this purpose will be in the neighbourhood of £5,000,000. The directors propose to raise £2,000,000 of this by the issue of 5 per cent Registered Unsecured Convertible Notes, which will be offered to shareholders and to raise a further £3,000,000 by means of loan facilities, which the Anglo American Corporation and associates have agreed to make available. Holders of the convertible notes will be entitled to convert the notes into shares of a nominal value of 10s. each at the rate of one share for every £3 of notes held at any time between the date of issue of the notes and June 30, 1957. Any notes not converted will be repaid at par on June 30, 1966, the company having the right to redeem all or any of the notes at 102½ per cent at any time between July 1, 1957 and June 30, 1966.

The £3,000,000 which the Anglo American Corporation and associates have agreed to lend to Ofsits will carry interest at 3 per cent for six years, and as consideration for these facilities, the lenders are to be given the right to convert any part of this loan into shares of the company at £3 per share at any time during the period of the loan. Anglo American and associates have also underwritten the note issue to shareholders for a cash commission of 1½ per cent on the issued price of the notes.

**President Brand's New Capital Issue.**—As foreshadowed by the chairman in his statement accompanying the recently published report and accounts for 1950, the directors of President Brand Gold Mining Co. have decided to raise further capital, which will *inter alia* replace the loan facilities provided by the Anglo American Corporation by which the development of the mine has been financed since the exhaustion of the capital initially raised on its formation. It is now proposed, subject to Treasury consent, to offer to stockholders 2,300,000 of the company's reserve 5s. shares at 20s. per share in the proportion of one for every two held. The shares will be payable in full on application. The issue is to be underwritten by the Anglo American Corporation, for a cash commission of 2½ per cent calculated on the issued price of the shares. The offer is available to stockholders registered in the books of the company on June 4. Provisional allotment letters will be mailed on or about June 15 and the offer will close on June 29.

### Welkom Shareholders Participate in President Brand Issue

In connection with the President Brand issue, it is announced by Welkom Gold Mining Co., which has a substantial shareholding in President Brand Gold Mining, and will be entitled to 500,134 reserve shares under the terms of the new issue, that the bulk of this entitlement (500,000 shares), will be offered to Welkom shareholders in the proportion of one President Brand share for every 20 Welkom shares held. Provisional allotment letters will be posted on or about June 15, to shareholders registered on June 4. The offer will close on June 29.

**St. Helena Seeking Further Loan Capital.**—It was announced at last week's annual meeting that St. Helena Gold Mines have accepted an offer from Union Corporation to advance £1,000,000 as a temporary loan carrying interest at 5 per cent, together with a raising fee of 1 per cent. This offer follows the negotiation recently of a second loan by St. Helena with the South African Mutual Life Insurance Society amounting to £4,000,000 at 5 per cent, repayable in annual instalments of £20,000. A sum of £355,000 is still outstanding on the first loan which is repayable on the same terms.

**Selection Trust.**—The preliminary statement of the results of Selection Trust Ltd. for the year ended March 31, 1951, revealed that consolidated dividend income advanced from £731,742 to £1,051,941, while profits on realization of investments has risen by £148,249 to £326,247. Although taxation was heavier by £159,944, the expanded earnings enabled net profit, after tax, to rise to £784,878 against £296,442. This in turn has made possible the stepping up of the dividend to 3s. 3d. per 10s. unit of Ordinary stock against 2s. in the pre-

vious year. Exploration reserve and investment reserve received £50,000 and £150,000 respectively, which is the same as last year, but in addition £100,000 has been placed to general reserve, leaving the forward balance higher by £68,413 to £310,063.

The report and accounts will be posted to stockholders on May 29, and the annual general meeting will be held on June 21.

**Consolidated Zinc Corporation.**—The preliminary statement of the accounts of the Consolidated Zinc Corporation for the year ended December 31, 1950 disclosed that the consolidated net profit amounted to £4,570,800, after providing £585,596 against £427,587 for depreciation. The corresponding net profit in 1949 amounted to £3,453,429. Taxation required £3,011,419 (£2,077,727). The proportion of profits attributable to minority interests was £129,701, leaving a balance of £1,429,680 which added to the carry forward from the previous year of £183,303, made a sum of £1,612,983 available for distribution. Dividend payments on the ordinary shares aggregated 2s. 6d. gross per share (same), which, together with the Preference dividends absorbed £545,620. The sum of £744,710 (£262,074) was transferred to reserves, leaving a balance of £322,653 against £183,303 to be carried forward.

The accounts will be posted to shareholders on May 24.

**Imperial Smelting Corporation.**—The preliminary statement of the accounts of the Corporation for the year ended December 31, 1950, showed that the year's operations resulted in a profit of £2,348,599 against £1,652,723. U.K. taxation required £1,655,037. The consolidated net profit amounted to £693,562 (£660,131). From the £661,630 available, the dividend on the 6½ per cent Cumulative Preference shares and a dividend of 6 per cent on the ordinary shares absorbed a net amount of £80,875, leaving a sum of £506,759 to be carried forward.

**Welgedacht Repayment on Debentures.**—Welgedacht Exploration Co. has decided to repay 2s. 8d. in the £ on the company's outstanding debentures amounting to £324,305. This repayment will absorb funds totalling £43,225 including approximately £28,000 from investments in the names of the trustees for the debenture holders, arising out of the sale of surplus plant and machinery which the trustees have agreed to release for debenture redemption. Repayment together with accrued interest, will be made on June 30, 1951, to debenture holders registered on June 9.

**The Mining Trust.**—The preliminary statement of the results of the Mining Trust for the calendar year 1950 showed that net profit amounted to £87,358 (£100,977), after providing £126,664 (£118,951) for income tax and profits tax. From the £133,726 available, dividend payment of 6d. per share against 5d. per share absorbed the net amount of £78,041. The carry forward was £54,198 against £46,368.

The net profit of the Trust's wholly owned subsidiary, the Britannia Lead Co. was £78,966. The dividend paid to the parent company of 75 per cent (50 per cent) amounted to £41,250.

**Rhodesia-Katanga Co.**—Profit and loss account of Rhodesia-Katanga Co. for the year ended December 31, 1950, disclosed a profit of £87. This was applied to the forward debit balance which now stands at £252,623. The company has large interest in Kentan Gold Areas, and through it in the Geita Gold Mining Co., and in Uruwira Minerals.

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### DIVIDEND No. 29

With reference to the notice of declaration of dividend published in the Press on April 27, 1951, it is now announced that dividend warrants will be posted on or about June 30, 1951.

The dividend on stock represented by stock warrants to bearer will be paid on or after July 2, 1951, upon surrender of the appropriate coupons at Barclays Bank (Dominion, Colonial and Overseas), Circus Place, London Wall, London, E.C.2, where listing forms may be obtained.

Coupons may also be presented for payment in French currency at Banque de l'Union Parisienne, 6 and 8, Boulevard Haussmann, Paris, 9e.

Coupons presented at Barclays Bank (Dominion, Colonial and Overseas) must be left four clear days for examination and may be presented any day (Saturday excepted) between the hours of 11 a.m. and 2 p.m.

United Kingdom income tax as indicated hereunder will be deducted from the dividend payable in respect of share warrant coupons presented for payment in London unless accompanied by inland revenue declarations. Where such deduction is made, the net amount of the dividend will be 9.706d. per 10s. unit of stock, viz.:—

#### PART I

50 per cent of Dividend regarded as payable out of profits earned before January 1, 1951, and subject to United Kingdom income tax:	
50 per cent of amount declared	Per 10s. Unit 6d.
Equivalent to a gross amount of	11.429d.
Less: United Kingdom income tax at 9s. 6d. in the £	5.429d.
	6d.

#### PART II

50 per cent of Dividend regarded as payable out of profits earned on or after January 1, 1951:	
50 per cent of amount declared	6d.
Less: United Kingdom income tax at 6s. 6d. in £ on the corresponding gross amount of 7.059d.	2.294d.
	3.706d.
Net amount	9.706d.

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W. E. GROVES,  
London Secretary.

NOTE.—As regards Part I of the Dividend, by reason of Double Taxation Relief, the net United Kingdom rate of tax payable by Rhodesian Anglo American, Ltd. on its profits up to December 31, 1950, is provisionally 4s. 7½d. in the £. Under Section 52 of the Finance (No. 2) Act 1945, tax is deductible from Part I of the Dividend at the full standard rate of 9s. 6d. in the £, but the rate at which any relief or repayment due may be allowed to a Stockholder is limited to the net United Kingdom rate.

As regards Part II of the Dividend, the London Paying Agents have been requested by the Commissioners of Inland Revenue to state:—

Under the provisions of Section 36 and the sixth schedule of the Finance Act, 1950, relating to "Unilateral Relief" from Double Taxation, Northern Rhodesian tax applicable to Part II of the Dividend is allowable as a credit against United Kingdom tax payable in respect of that part of the Dividend.

The deduction of the tax at the reduced rate of 6s. 6d. in the £ instead of at the standard rate of 9s. 6d. in the £ represents a provisional allowance of credit at the rate of 3s. in the £. The final rate of credit allowable to a particular Stockholder depends on his personal rate of tax; it may be less than 3s. in the £ as it must not exceed three-quarters of the personal rate. Revision of the credit involves a corresponding adjustment of the amount shown as the gross amount of Part II of the Dividend for United Kingdom tax purposes.

## Mining Men and Matters

**Mr. P. A. Ashmead Bartlett** has been co-opted a director of Esperanza Copper & Sulphur.

**Mr. William Brown** has been appointed metallurgical chemist and assayer to Nanwa Gold Mines.

**Mr. W. Marshall Clark** has been appointed a director of St. Helena Gold Mines in place of Sir Ernest Oppenheimer, resigned.

**Mr. L. W. Elsum** has been appointed general manager of the Yawa Tin Lodes (Pyicha), Mergui, Lower Burma.

**Major K. Gordon** has resigned from the board of Central Mining & Investment.

**Mr. W. E. Groves** has been appointed a director of Lydenburg Estates.

**Mr. A. L. Job** has been appointed Inspector of Mines, Tanganyika.

**Mr. J. K. Macdonald** has joined the staff of Rhodesia Chrome Mines.

**Mr. K. Richardson** and **Mr. A. C. Wilson** have been appointed directors of Mufilira Copper Mines in place of Mr. J. B. Dennison and Mr. C. F. S. Taylor, resigned.

**Mr. Ralph Symons** has been transferred from Consolidated Murchison (Transvaal) Goldfields and has been appointed manager of No. 2 North Section, Randfontein Estates.

**The International Geological Congress** will be held in Algiers from September 8 to 13, 1952.

**The National Industrial Safety Conference** will be held at Scarborough from May 25 to May 27, 1951.

**The Patent Office Library**, 25, Southampton Buildings, Chancery Lane, London, W.C.2, is now open to the public from 10 a.m. until 9 p.m., Mondays to Fridays inclusive, Saturday opening: 10 a.m. to 5 p.m.

**The Gauge and Toolmakers' Association** have announced that this year's Gauge and Tool Exhibition will be held at the New Hall of the Royal Horticultural Society, Elverton Street, Vincent Square, London, S.W.1, from Tuesday, May 15, to Friday, May 25, both days inclusive.

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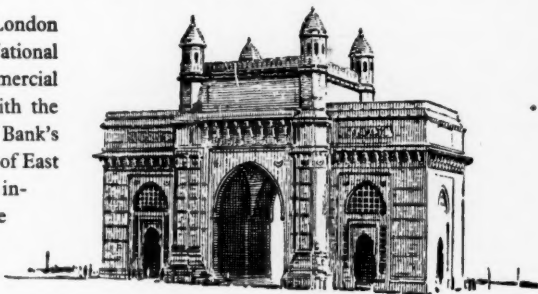
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